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Musculoskeletal neck disorders

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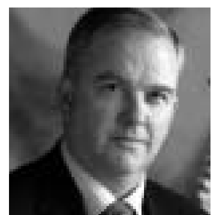

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Overview of mechanical neck disorders

PAIN in, and from, the neck should be a problem for us to address, not a mystery to bewilder us. Mechanical neck disorder is not just a diagnosis by exclusion of other pathology; there are clinical patterns and criteria we can use to make a clinical diagnosis and guide specific treatment.

Patients with mechanical neck dysfunction usually present with pain and often also complain of a reduced range of neck motion. Upper-limb symptoms may be referred (eg, from scalene muscles) or radicular (eg, due to a compressed lower cervical nerve root).

Headaches and atypical facial pain are also a common but under-recognised presentation of musculoskeletal dysfunction in the neck. In my experience, disturbance of balance, which is probably due to altered proprioceptive input from musculoskeletal dysfunction in the upper cervical joints and sternocleidomastoid muscles, is another under-recognised treatable presentation of cervical dysfunction.

Acute neck pain

In acute presentations, patients can be appropriately reassured that their neck pain is likely to be self-limiting. Simple analgesics such as paracetamol are cheap, relatively safe and effective. Stronger NSAIDS are not recommended (because of GI bleeding risk and the fact that inflammation is often not the main pain source).

Very reduced activity due to pain should be minimised to a couple of days if possible. The use of soft collars has been found to delay improvement. Low-impact aerobic activity such as swimming, stationary cycling and walking can be helpful. However, 15-40% of acute neck pain presentations become chronic.

Take particular care to exclude pathology when neck pain is:

- A consequence of a high-velocity injury.
- Continuous or persisting.
- Severe.
- Accompanied by pain that radiates down the upper limb, especially beyond the elbow.
- Accompanied by numbness rather than just paraesthesiae (suggesting root compression), especially if two dermatomal areas are involved (suggesting tumour).

Persisting pain versus neuropathic pain

It is important to be aware that all persisting musculoskeletal pain is not necessarily neuropathic. When pain is neuropathic it is often described as burning in character, and there may be allodynia, when pain results from a stimulus such as light touch that does not usually cause pain.

Persistent pain is often nociceptive, involving local or nearby pain generators and irritation of nociceptive nerve endings, as occurs in acute pain. In

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most cases, persisting pain has both nociceptive and neuropathic components. The doctor should assess each patient as to the notional 'pain mix' present. That mix is not necessarily dependent on how long the pain has been present (figure 1).

A trial of therapy directed at possible pain generators found on physical examination, such as trigger points or segmental dysfunction, is often appropriate. In my experience, treating pain generators with physical techniques such as joint mobilisation and trigger point injection is often effective, even if pain has been present for years.

Patterns of pain referral

The upper neck refers pain to the scalp and upper face. The mid-neck causes local neck pain or subclavicular pain, and the lower neck refers to the upper back, shoulders and arms. In patients with neck pain, always ask about headache, arm or upper back symptoms, and vertigo (see later).

Investigations

Imaging, of course, does not show pain. However, it often shows degenerative changes in the neck that may be incidental and irrelevant to the symptoms. Patients with pain may have normal imaging findings and patients without pain can have abnormal imaging findings.

Imaging has a very limited but important role in the investigation of neck pain, mainly when the history alerts us to possible serious disease or injury, or when pain is failing to improve, especially in the elderly.

Plain films should include flexion and extension views to show spinal instability.

CT is useful for demonstrating fracture and bony stenoses or for assessing suspected paranasal sinus pathology as a cause of facial pain. However, CT is of limited accuracy in demonstrating disc protrusions in the lower cervical spine.

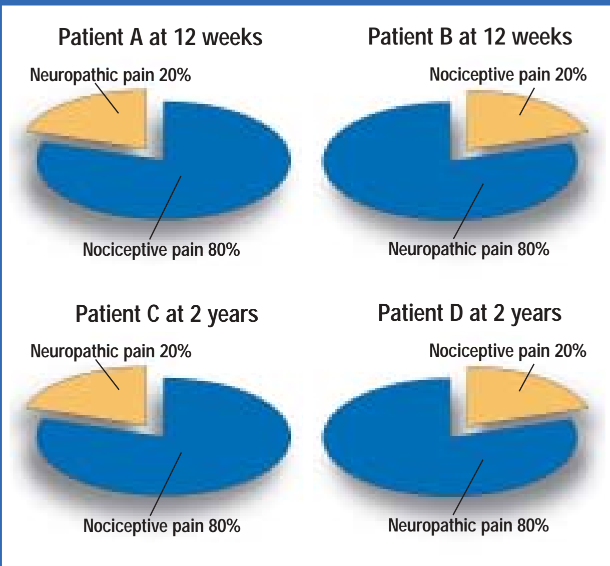
MRI shows soft tissues more clearly than CT, including the lower discs, and is the investigation of choice in suspected myelopathy.

Radionuclide bone scan has a limited role but may be helpful in showing active arthritis (especially if other joints in the body are involved) or spinal infection.

Nerve conduction studies are not normally needed but may be helpful in assessing the so-called 'double crush' syndrome, when there is cervical radiculopathy as well as peripheral nerve entrapment, such as at the carpal tunnel.

Blood investigations are not appropriate in acute presentations. The exception is an ESR in the elderly if neck pain is associated with headache, to exclude giant-cell arteritis.

Figure 1: A notional mix of pain mechanisms in four hypothetical patients: A and B at 12 weeks, C and D at 2 years. In an individual patient the ratio of nociceptive and neuropathic pain is not necessarily duration dependent. However, neuropathic mechanisms often predominate over time.



The GP's role

Musculoskeletal structures in the neck — the muscles, joints and discs — are common sources of local neck pain and referred pain.

GPs have an important role not only in excluding the relatively rare serious diagnoses (<1% of acute neck pain) such as fracture, major ligamentous disruption, inflammatory arthritis, neoplasm, significant root compression or visceral causes in patients presenting with neck pain, but also in identifying and managing the much more common cause of pain — mechanical neck disorders.

Neck pain can have many causes, including:

- Degenerative joint disease.
- Neuronal compression by spinal neurocentral canal or lateral foramen stenoses.
- Spinal instability (from trauma or inflammatory disease such as rheumatoid arthritis), inflammatory joint disease (rheumatoid arthritis, psoriatic arthritis).
- Torticollis (a dystonia; some argue that torticollis is a secondary phenomenon).
- Referred visceral pain (heart, gall bladder) and local visceral pathology (tumour or infection).

In my view neck pain arises more commonly from segmental dysfunction (including facet joint syndrome) and from myofascial trigger points.

A careful history, including a history of conditions such as rheumatoid arthritis, psoriasis, colitis and family history, is very important. The examination should be directed by knowledge of common musculoskeletal pain generators and their patterns of referral, and should always include palpation of the facet joint column and large muscles of the neck (see later).

Neurological examination of the upper limbs is usually required only when there are symptoms of possible cervical radiculopathy, with upper limb weakness or numbness, or if paraesthesia extends distal to the elbow. The diagnosis should direct specific treatment.

Musculoskeletal origin of pain in, and from, the

MUSCULOSKELETAL neck pain may originate from:

- Musculo-tendinous tender points at the attachment of cervical muscles to the skull.
- The cervical spine, from intervertebral or segmental dysfunction, cervical spondylosis, arthritis of the atlanto-occipital joint or disc annulus tears.
- Myofascial pain referred from the muscles of the neck, that is, trigger points.
- Lateral foraminal stenoses by disc or bone, causing radicular pain.
- Entrapment neuropathy of the greater or lesser occipital nerve.
- Torticollis. Neck muscle spasm usually accompanied by pain. Chronic torticollis is rare; it occurs mainly in middle-aged adults and often responds to botulinum toxin injection. Acute torticollis, which is common and occurs mainly in children, responds to tense-and-stretch manual therapy.

Knowledge of these syndromes, including their history and, in particular, their characteristic distribution and clinical signs, allows correct diagnosis and appropriate treatment of neck pain and associated headaches. This may avoid expensive and unnecessary investigation or trials of unfocused treatment.

For example, it is reported that very few CT scans of the head prove to be diagnostic in the assessment of subacute or chronic headache. In a US study of 161 patients with headaches investigated with cranial CT, only two (1.2%) had intracranial tumours and both these had abnormal neurological findings on physical examination.[1]

The researchers concluded that a careful physical examination should be performed in the assessment of headache. I believe this applies to neck pain, even if it is not associated with headache.

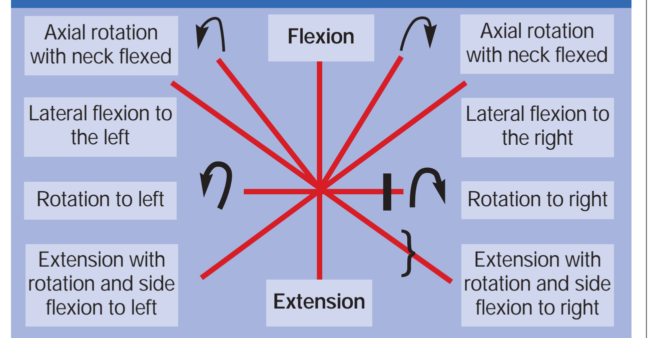
A helpful tip is to have the patient fill in a simple pain chart with a body map, pain descriptors and a visual analogue pain scale, while they are in the waiting room.

Pathophysiology of cervicogenic headaches

Not all experts agree on the role of musculoskeletal structures in headache. Some consider that headaches are very rarely referred from the neck (cervicogenic). However, there is anatomical support and human experimental evidence that headache, in either a trigeminal nerve or upper cervical nerve distribution, can be referred from the neck and that it can be relieved by treatment of underlying neck dysfunction.

Also, in my experience, cervicogenic headache often transforms into episodes of classic migraine, and the

Figure 2: Grid diagram to record range of motion of the cervical spine, notated to indicate restriction of rotation to right, and pain to the right side with restriction of rotation into the right extension quadrant (typical of facet joint syndrome, in this case on the right side).



episodic migraine often stops when the background cervicogenic headaches respond to passive manual neck mobilisation combined with stretching and mobilising.

Nociceptive headaches

Nociceptive headache can arise whenever a pathological process affects the nerve endings of axons that relay to the trigeminocervical nucleus in the brainstem.

The trigeminal nerve innervates the skin of the face and forehead, the nasal and oral cavities, teeth, temporomandibular joint, paranasal sinuses, the orbit, the dura mater of the middle and anterior cranial fossae and the larger vessels and venous sinuses in these tissues. The seventh, ninth and tenth cranial nerves innervate the ear, pharynx and larynx, and the carotid sinuses and bodies.

Headache mediated by the trigeminal nerve tends to be associated with frontal pain, whereas headaches mediated by cervical nerves tend to have an occipital distribution.

The first three cervical spinal nerves have a cranial and extracranial distribution. In the head, the cervical nerves supply the dura mater of the posterior cranial fossa and the vertebral artery by way of the cervical sinuvertebral nerves and the meningeal branches of cranial nerves X and XII.

In 1986, Professor Bogduk, currently professor of pain medicine at Royal Newcastle Hospital and Director of Newcastle Bone and Joint Institute, suggested that the upper cervical spine may be a potent source of headache.

Because nociceptive afferents from the upper cervical spinal segments converge on second-order neurons in the trigeminocervical nucleus, a noxious stimulus affecting the upper cervical spine is perceived not only as pain in the neck but also as pain in the distribution of the trigeminal nerve; hence, headache, including facial pain.

Experiments on provocation of referred pain from the cervical spine to the head were repeated by Bogduk in 1989, using hypertonic saline injected into the upper cervical facet joints. With injections at C1, pain was referred to the occipital and frontal areas, while at C2-C3, pain was experienced in the neck and head.

Headache is a common symptom in patients suffering whiplash-type injuries. In 1994, Barnsley, et al studied 100 patients with neck pain after whiplash, 41% of who described headache as their dominant complaint.[2] Double-blinded, controlled, local anaesthetic blocks of the third occipital nerve were used to establish the prevalence of headache stemming from the C2-3 zygapophysial joint in these two groups.

Headache triggered by third occipital nerve dysfunction was found in 53% of those with headache as the dominant complaint. That is, more than half of these patients had headache stemming from their C2-3 zygapophyeal joint. According to Lord there were no demographic features characterising patients with third occipital nerve headache.

The yield from diagnostic blocks of the third occipital nerve was low if a patient did not have a history of neck pain and headache, with headache being the patient's dominant complaint, and tenderness on palpation over the C2-3 articular pillars (usually unilateral, sometimes bilateral).

In a later study on chronic neck pain after whiplash, Lord, et al studied 68 consecutive patients.[3] Among patients with dominant headache, comparative blocks revealed that the prevalence of C2-C3 zygapophyseal joint pain was 50%. Among those without C2-C3 zygapophyseal joint pain, placebo-controlled blocks revealed the prevalence of lower cervical zygapophyseal joint pain to be 49%.

Overall, the prevalence of cervical zygapophyseal joint pain (C2-C3 or below) was 60% (95% confidence interval, 46% to 73%). It was concluded that cervical zygapophyseal joint pain is common among patients with chronic neck pain after whiplash.

Cervical intervertebral dysfunction

Cervical intervertebral dysfunction is recognised by musculoskeletal physicians as a common cause of headache affecting occipital, parietal, frontal and periorbital areas. The essential clinical findings

neck

in this condition are palpatory changes interpreted as restriction in the range of passive intervertebral movements in one or more of the upper three cervical vertebrae.

The spinal mobile segment

One of the basic anatomical and pathophysiological concepts in understanding and treating pain due to vertebral column and spinal muscle dysfunction is the concept of the mobile segment of the vertebral column. At each spinal level three important joints act as a single functional unit: the single anterior intervertebral disc joint and the two posterior zygapophyseal (facet) joints.

This mobile segment contains supporting anatomical elements between the vertebrae: the anterior longitudinal ligament, the posterior longitudinal ligament, the ligamentum flavum, the interspinous and supraspinous ligaments and the relevant nerves.

The successive layers of these mobile segmental joints form a complex flexible system whose function depends largely on the integrity of the intervertebral disc. If the disc is injured, other structures are inevitably involved. Proper functioning of the spine involves perfect synergy of the muscles that support the vertebral column.

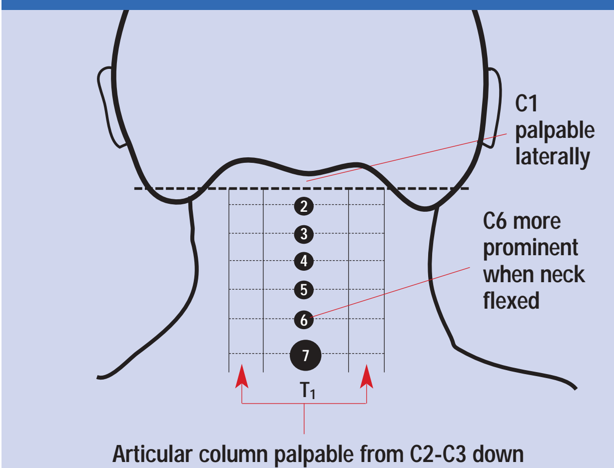
The two main nerve supplies to the mobile segment are the posterior primary rami and the sinuvertebral nerves.

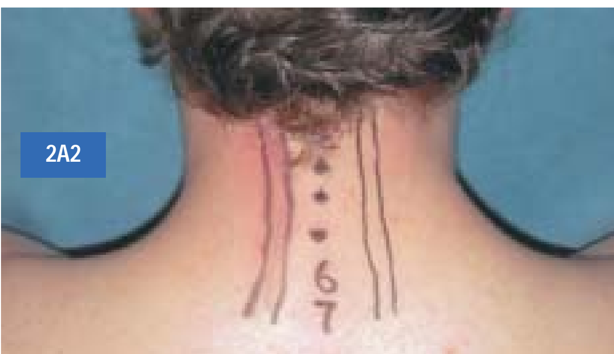
Clinical assessment of intervertebral (segmental) dysfunction

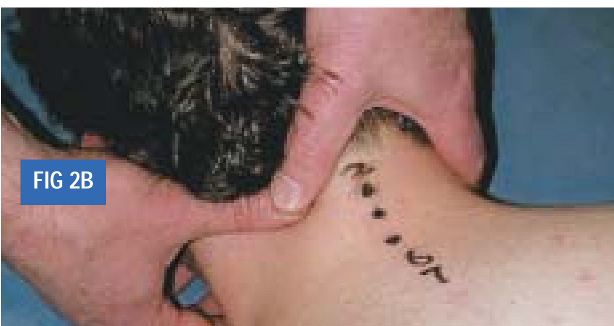
According to Professor Robert Maigne, Chef du Service de Reeducation et de Medecine orthopedique de l'Hotel-dieu (Universite Paris VI), intervertebral dysfunction is characterised by:

- Hypomobility, with restriction of passive range of movement at an intervertebral level, usually on the same side, sometimes bilaterally.
- Ipsilateral tenderness to palpation over the facet joint column at that level.
- Ipsilateral hyperalgaesia, with increased irritability of the skin to pinch and roll provocation over corresponding recognised skin areas (usually dermatomal, except on the brow and cheeks, where trigeminal nerve interconnections apply).

Figure 3: A: Relative locations of the spinous processes of the cervical joints and the facet joint articular columns. B: Palpation of the cervical spine with the patient prone, to find segmental dysfunction by pressing over the articular column.







Examination of cervical segmental dysfunction

The objective of the examination is to reproduce the patient's symptoms when possible, detect the symptomatic level and determine the cause of the dysfunction.

Observe:

- Posture: there may be a 'poke' neck, characterised by upper cervical spine extension with straining of the sub-occipital muscles.
- Active range of movement:
  - — flexion/extension (normal 45–50°).
  - — lateral flexion left and right (normal 45°).
  - — rotation left and right (normal 75°). These findings can be summarised in a grid diagram (figure 2).

Test:

- Passive range of movement (patient supine on couch) through flexion and extension, lateral flexion and rotation.
- Rotation range with neck flexed (a good indication of atlanto-axial hypomobility).

Palpate:

- Tenderness centrally over the spinous process of C2-C7. This should be tested with the patient prone.
- Paraspinal tenderness over the lateral masses and articular columns of the cervical spine (figure 3). This can be assessed prone but is better with the patient supine because the cervical paraspinal muscles are more relaxed.
- Hyperalgaesia: irritability of the skin to pinch and roll provocation testing over specific skin areas.

Typical findings in segmental dysfunction form a triad of signs:

- Unilateral tenderness over the facet joint.
- Restriction of range of mobility on the same side as the complaint of pain.
- Often hyperalgelsia over the ipsilateral skin area corresponding to the joint. Hyperalgesia may affect the dermatome of that spinal level or, in the face, it may affect the skin supplied by the trigeminal sensory nucleus.

> **Segmental dysfunction**
>
> **Diagnosis**
> - Restricted range of motion on the same side as the pain
> - Unilateral tenderness over a facet joint on same side as the head, neck or upper back pain
> - Associated changes in tissues supplied by that neurological level:
>   - — Skin: hyperalgaesia +/– allodynia
>   - — Muscle: tender, tight bands
>   - — Periosteum: tender
>
> **Treatment**
> - Mobilisation (gentle, specific passive movement of segment)
> - Manipulation (rarely needed and associated with increased CVA risk)
> - Facetal/peri-facetal injection may help
> - Home exercises

The symptomatic facet joint can be reliably identified by physical examination performed by an experienced examiner. Research has shown an experienced examiner to be as good as provocational injection and anaesthetic blocks at identifying the site of dysfunction.

Management of segmental dysfunction

Spinal manual therapy. Restrictions of cervical movements respond well to gentle, passive mobilisation techniques. Many GPs have learnt simple and effective manual treatments at the manual medicine courses started by Clive Kenna and John Murtagh or, more recently, at RACGP training program sessions taught by the Australian College of Physical Medicine and at Australian Association of Musculoskeletal Medicine annual scientific meetings.

Basic techniques are outlined below under 'Treatment of mechanical neck disorders'. GPs who seek more advanced training or revision of their previous training can contact the Australian College of Physical Medicine web site: www.physicalmedicineaustralia.com.au

The Australian College of Physical Medicine runs courses for GPs, taught by fellows and masters of physical medicine (musculoskeletal) graduates of the University of Sydney.

Manual therapy combined with exercises is supported in the Cochrane review for neck pain lasting more than one month, with or without headache. This produces decreased pain and increased activity levels, at a reduced cost. One study from Monash University has suggested that manual treatment is twice as effective as conventional care, including physical therapy and usual GP care.[4]

In my experience, headaches due to segmental dysfunction often respond immediately to manual therapy. However, the role of manual therapy is not clear from the literature and the evidence is contradictory. It is questioned by some to what extent the observed treatment effects could be explained by manipulation or by non-specific factors (eg, of personal attention or patient expectation). Future studies need to address these two crucial questions and overcome the methodological limitations of previous trials.

Manipulation using a very short high-velocity thrust at the intervertebral joints is rarely required. There is a fourfold increase in cerebrovascular strokes after recent manipulation, according to Canadian research. Such complications are not common. However, there are important contraindications to high-velocity manipulation (vertebrobasilar insufficiency, warfarin treatment, and hypermobility as in the young — especially young female patients).

Injection for segmental dysfunction. Intra-articular and peri-articular injections of corticosteroid and anaesthetic to the facet joint are a well-established treatment for spinal pain. However, these remain controversial, with contradictory evidence regarding efficacy. In some studies these techniques are more successful for neck pain that has not responded fully to manual treatment.

Radiofrequency denervation. Radiofrequency denervation using a heated metal-tipped probe inserted transcutaneously under imaging control has a proven role in appropriately selected cases (after provocational injection and anaesthetic block trials have demonstrated the site).

The outcome of such treatment of whiplash injury with persisting headache has been shown to be independent of compensability status (if workers' or accident insurance liability is involved).

Myofascial pain and trigger points

THE phenomenon of referred pain from muscles has been studied since the 1930s. In the 1940s Janet Travell in the US came to recognise the importance of what she termed trigger points as being the source of pain in many common musculoskeletal disorders.

Her clinical studies suggested it was possible to alleviate this kind of pain by injecting local anaesthetic or a variety of other solutions into the trigger point. Travell developed a map of the most likely sites of trigger points in each muscle and their most common referral patterns.

She defined trigger points as "a focus of hyper-irritability in a tissue that, when compressed, is locally tender and, if sufficiently hypersensitive, gives rise to referred pain and tenderness and sometimes to referred autonomic phenomena and distortion of proprioception".

Table 1: Trigger points causing headache

Trigger point	Site of referred pain
Temporalis	Eyebrow, temporal and parietal regions
Masseter	Periauricular area
Posterior cervical muscles	Occiput
Sub-occipital muscles	Cranium and orbit
Sternocleidomastoid	Forehead, vertex, occiput, periauricular areas and cheek
Trapezius	Temples and parietal areas
Pterygoids	Ears and zygoma

Myofascial trigger points are still a controversial concept. The validity and reproducibility of trigger point examination is not supported by the few studies that have been undertaken.

Injections of local anaesthetic into tender points in muscle do produce pain relief. Whether trigger-point treatment is just a method of stimulation-provoked anaesthesia via the gate-control pain model, or whether trigger points are histological as well as myophysiological entities, is not yet clear.

Altered electromyographic potentials have been shown in trigger points (localised by palpation) compared with the rest of the muscle. Recent electron microscopic studies in humans at the University of Heidelberg in Germany show bunched-up myofibrils in these areas.

Important trigger points causing headache

Trigger points in the neck and jaw muscles refer pain to the cranium (table 1; figure 4).

Musculoskeletal dysfunction in the neck and the masticatory muscles often co-exist. In these cases, symptoms arising from both the temporomandibular joint complex and the neck need to be addressed.

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Clinical assessment of trigger points

The pain is often described as aching and its recurrence may be strongly related to muscle activity, such as motion or posture (this is not always obvious).

There is reproducible, exquisite spot tenderness in the muscle at the trigger point, with pain referred locally or at a distance on mechanical stimulation of the trigger point by pressing the trigger point or stretching the muscle involved.

There is a palpable hardening of taut muscle fibre bands containing the tender spot in a shortened muscle. Local twitch response of the taut band in the muscle occurs when the trigger point is stimulated by a snapping palpation, or sometimes just with pressure.

Management of trigger points

Travell and Simons' classical treatment of trigger points is by irritation of the overlying skin with vapour coolant (ethyl chloride) spray as a cooling and tactile irritation, while stretching the affected muscle, followed by application of a heat pack for 90 seconds.

The patient is then instructed in a twice-daily exercise program using application of heat for 10 minutes over the affected muscle, after firm passive stretching for 90 seconds.

Other techniques include hyperstimulation analgesia produced by irritation of trigger points by dry needling, as in acupuncture, injection of normal saline, or just digital compression. These treatments can produce prolonged, even permanent, relief of myofascial pain.

A more effective technique, also developed by Travell, is the injection of 0.5% or 1% lignocaine solution into and around the trigger point, followed by stretching for 90 seconds. Other physicians have modified the stretching technique by using passive stretching after active isometric contraction.

The interplay of joint dysfunction and trigger points

The interplay of joint dysfunction and trigger points is alluded to in the literature. If a muscle with trigger points is shortened (as is the case), it follows that the joint across which it acts is restricted in its motion (either in rate or range).

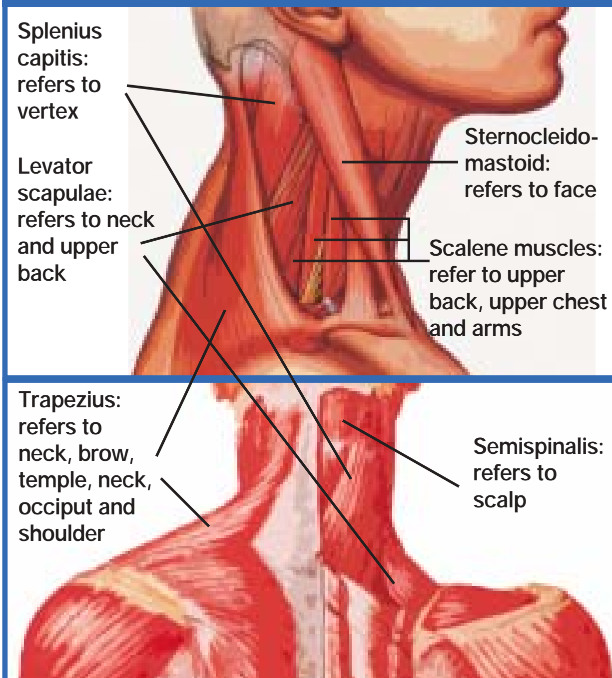
It is important when assessing range of spinal movement to always look for trigger points in association with intervertebral joint dysfunction if pain is elicited on the side contralateral to the direction of limitation of movement; that is, in the muscles that are shortened.

For example, a left-sided, cervical, minor intervertebral dysfunction with restricted lateral flexion to the left is sometimes associated with a right-sided trigger point in the trapezius muscle.

The trigger point may need to be treated before the cervical segmental dysfunction can be specifically mobilised, or the segmental dysfunction treated before the trigger point will respond to treatment.

The interrelationship of myofascial pain and joint dysfunction is not yet clear. Trigger points are often found in the myotome of the spinal level associated with the intervertebral/ segmental dysfunction.

Figure 4: Neck muscles involved in head and neck pain and their common pain referral patterns.



Trigger points

Diagnosis
- Tender points in muscles
- Pain referred in typical recognised patterns
- Twitch response to pressure or injection or stretch
- Often contralateral pain on neck rotation

Treatment

Pressure

Acupressure (Bowen therapy), which involves pressing with the thumb deeply onto the tender point until it relaxes, and 'flicking' – digital pressure across the tight band in which the trigger point lies, then sudden release of pressure (like plucking a guitar string)

Stretching
- Spray and stretch (efficacy of the use of vapour coolant spray is not proven)
- 90 seconds + heat
- Tense and stretch or 'muscle energy' exercise

Injection into trigger points
- 0.5% lignocaine, normal saline or dry needling (preferably followed by stretching)

Home exercises (stretching)

Posture advice (eg, at the work station)

Treating mechanical neck disorders

Segmental pathology

IF examination indicates it is likely that pain is being generated from segmental dysfunction involving the cervical spine facet joints and closely associated muscles, ligaments and nerves, mobilisation can be carried out by applying gentle thumb pressure directed postero-anteriorly over the tender level of the facet joint articular column (figure 5).

Always apply pressure that is 'short of the pain', as provoking pain during mobilisation only causes exacerbation. This must be very gentle and cause no discomfort. Ask the patient to report any discomfort and, if they do, ease to a lesser pressure.

Move your thumbs up and down in rhythm about once a second. Do this for 30-60 seconds. Repeat if pain and limitation of movement has only partly improved.

Pain is often dramatically reduced immediately. Signs such as reduced range of motion, tenderness and hyperalgaesia often also resolve immediately (the mechanism of the latter is not yet understood).

It is important to teach a home mobilising exercise such as the 'muscle energy' exercise (figure 6) so that the patient can consolidate the treatment with self-therapy after the consultation.

Myofascial pain syndrome (trigger points) involving the large muscles of the neck

Inject 0.5% lignocaine solution into the trigger point then apply gentle stretching to the muscle involved, by gently and passively distracting its bone attachments (eg, by manually drawing the occiput away from the scapula to stretch the upper border of the trapezius).

If injecting the trapezius or levator scapulae, it is very important to avoid placing the needle too deeply because there is a risk of penetrating the pleura and causing pneumothorax. Also, it is very important to avoid injecting into the posterior triangle of the neck, where the vertebral arteries are at risk of injury.

Treatment evidence

Overall, there is a lack of evidence and high-quality studies into the treatment of acute neck pain. There is evidence that supportive cervical collars are not effective for acute neck pain. Treatment evidence for chronic neck pain is summarised in table 2.

I have found the following to be helpful:
- Simple analgesics such as paracetamol may be as effective as NSAIDs, with fewer GI and renal side effects.
- If treatment is required, it should be directed at specific pain generators, if identifiable (segmental dysfunction or trigger points), and exercises provided to mobilise the segments and stretch the trigger-point-affected muscles. Treatment should be specifically directed at the trigger points and areas of joint dysfunction (avoiding high-velocity, especially rotatory, manipulation). GPs without postgraduate manual medicine training may refer to manual therapists or to doctors with training in musculoskeletal medicine and manual therapy.
- Manual therapy (mobilisation) is more effective and less costly than physiotherapy (which, when narrowly defined, does not use spinal mobilisation) and standard medical care for treating neck pain of more than two weeks' duration. Patients recover more quickly and report reduced intensity of pain, reduced functional disability and improved quality of life.
- Combining manual therapy and exercises is supported by the literature. Manual treatment combined with exercises speeds recovery and return to work in acute and chronic mechanical neck disorder.
- Acupuncture may be helpful.
- The underlying biomechanical and postural muscle problems should also be addressed after treatment by stretching of trigger-point-affected muscles (with injection if necessary) and mobilisation of segmental dysfunction levels.
- Home stretching and mobilising exercises (figure 6) and instruction in biomechanically appropriate posture when standing and sitting is helpful in preventing recurrence in chronic neck problems.
- If the patient sits at a desk at work, advise sitting with knees slightly lower than the hips to unload the spinal muscles, including the dorsal neck muscles (figure 7). Head sets should be used for prolonged telephone work. Use of a shaped, rolled-edge pillow to support the head in bed at night is supported by a Cochrane review. Mini-breaks from the workstation posture may help.
- Review by the doctor at 6-8 weeks (earlier for whiplash) is generally recommended in acute neck pain to re-assess the need for continuing treatment or change of treatment.

Table 2: Evidence base for treatment of musculoskeletal neck disorders*

- Most acute neck pain resolves over weeks or months (in 15-40% it does not)
- Rest and immobilisation using collars are not recommended for the treatment of whiplash (level 2)
- For 'whiplash', early manual therapy is the only treatment vindicated by the literature
- Manual therapy (specific mobilisation) is better than traditional GP care (analgesics, counselling and patient education) or physical therapy (such as ultrasound, interferential, heat and exercise) without specific mobilisation for treating non-specific neck pain (level 2)
- On meta-analysis early manual treatment accelerates improvement, especially if combined with exercises (level 1)
- Manual treatment combined with exercises gave short-term and long-term maintained benefits for sub-acute mechanical neck disorders (level 1)
- Mobilisation vs manipulation: no significant difference in response in chronic neck pain (level 2)
- There is no evidence of serious complication from cervical mobilisation without thrust (level 1)
- Manual treatment beyond a year is no better than exercises alone
- 0.5% lignocaine is a more effective and more lasting than injection of normal saline to muscle tender points (level 2)
- Cervical medial branch neurotomy (by heating using a radiofrequency probe) can give medium- to long-term (up to 20 months) relief from pain referred from the facet joint, eg, neck pain or cervicogenic headache) (level 2)
- Strengthening exercises for the neck do not appear to help (level 2)

*References are available on request

- Muscle relaxants such as baclofen (10mg tds) may be helpful if there is marked muscle spasm. Tramadol (Tramal, Zydol), a synthetic analgesic with weak opioid-like activity and which is apparently not addictive and acts via other pain mediator actions, may be helpful. It is important to avoid combining tramadol with SSRIs, to prevent serotonin syndrome (hyperpyrexic crisis). The use of opioids remains controversial but, if used, they should be taken at regular intervals, for short periods only and reviewed regularly.
- Trials of analgesic adjuvant therapy for persisting pain, using low-dose tricyclic antidepressant or anticonvulsant therapy, are appropriate.
- Persisting pain despite simple interventions may need investigation and/or referral. Early referral is recommended if there are psychosocial risk factors or any signs or symptoms of serious physical abnormality. Treat anxiety or depression if present. Referral to a musculoskeletal physician, pain physician or pain clinic is appropriate for persisting pain. Neurological, neurosurgical or ENT reviews may be needed in special circumstances.
- Cognitive behaviour therapy may help levels of activity and analgesic use. Six sessions were shown to be helpful in one controlled study.

Figure 5: Mobilisation of a cervical segment by applying gentle thumb pressure postero-anteriorly over the tender level of the facet joint articular column.

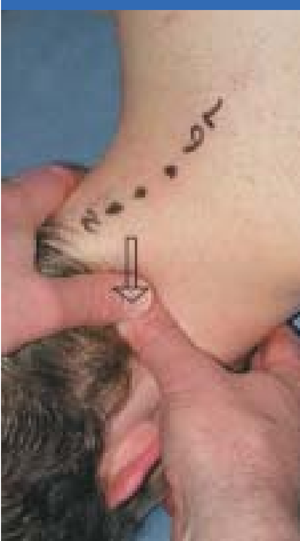
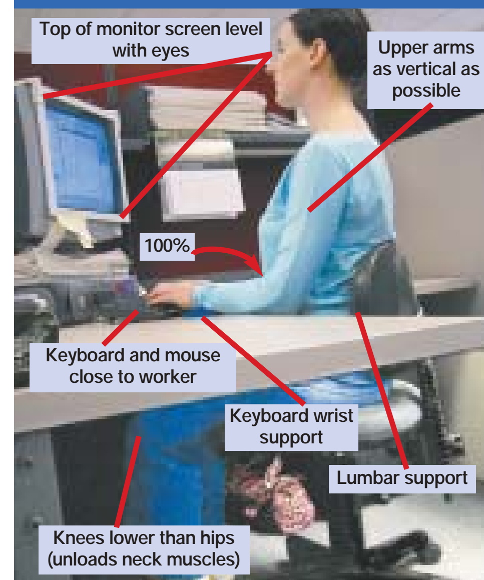


Figure 6: Patient instructions for resisted side bending (right-sided problem). Sit upright in a chair, tuck your chin in and keep your head straight. Place your right hand over the top of the head to grasp the head just above the ear. Pull your head down until it first begins to feel uncomfortable. Take a deep breath in — hold it — press firmly against your hand for seven seconds (you will be pushing to the left). Breathe out, relax and then pull your head firmly to the right. Repeat this 3-5 times. (After Kenna and Murtagh, 1996).

Figure 7: A desirable, balanced, sustained seated posture that is strain-free. (A slouched posture shortens anterior chest muscles and places sustained load on the posterior neck muscles to support the head.)



Emerging developments

TREATMENT of trigger points by injection of botulinum toxin has been tried in recent years. It is extensively and effectively used for chronic torticollis.

It acts by blocking release of acetylcholine at the neuromuscular junction, causing reduced muscle contraction, and by blocking release of pain-mediating substances in neurons.

This may be a significant mechanism of action in reducing cervicogenic headache as well as migraine. It may provide a three-month window of pain relief during which analgesic intake can be reduced, exercises undertaken and normal activities restarted.

The only studies that have been conducted are small and there is conflicting evidence — stronger for its use in headache than in neck pain.

Cervicogenic vertigo

Postural muscles, including the suboccipital and sternocleidomastoids and the upper cervical joint complex of the occipito-atlanteal, atlanto-axial and C1-2 and C2-3 joints, are dense with stretch receptors and proprioceptors, and have rich central connections to the vestibular nucleus.

This is a theoretical explanation for the improvement in vertigo seen after manual therapy to the neck in cases where there is no proven labyrinthine or cerebellar cause.

In one small study, 23 patients with post-traumatic headache one year after head trauma entered a prospective, controlled clinical trial to find out if specific manual therapy on the neck could reduce the headache. Five weeks after two manual treatments there was significantly reduced pain, use of analgesics and frequency of associated symptoms such as dizziness, visual disturbances and ear symptoms.[6]

The researchers concluded that manual therapy seemed to have a specific effect in reducing post-traumatic headache and suggested that post-traumatic dizziness, visual disturbances and ear symptoms could be part of a cervical syndrome.

Of course, doctors should always consider central causes of vertigo by looking for unilateral hearing loss, benign positional vertigo and cerebellar signs. A trial of neck structure mobilisation is indicated if no firm evidence of central causation of vertigo is found and signs of mechanical disorder are found on palpation of the neck.

Summary

IN any comprehensive medical assessment of a patient presenting with pain in the head (including the face), neck or upper limbs, or with disturbance of balance, both cervical joint dysfunction and myofascial pain syndromes in the neck need to be considered.

If the condition is acute and mild, reassurance is appropriate and no specific therapy is needed. When the symptoms are more severe and there is segmental dysfunction, use passive mobilisation at the segment (or refer if you are not trained) and teach mobilising exercises to the patient.

Treat trigger points by injection of normal saline or 0.5% lignocaine, then teach the patient the appropriate stretching exercise. Advise about seated posture and use of a support pillow.

Review by the doctor is recommended at 6-8 weeks, or earlier (by three weeks) for whiplash injuries.

In chronic pain, sometimes finding and treating these syndromes does not give the rapid relief that we find in acute cases. It is reasonable to give a short trial (1-4 sessions) of manual mobilisation or trigger point treatment. If this fails, analgesic adjuvants such as low-dose antidepressants, anticonvulsants or tramadol are often helpful.

Cognitive behaviour therapy with a psychologist with experience in pain management or through a pain clinic may have a role in chronic neck pain. In fibromyalgia syndrome, manual treatment or injection techniques do not help and usually cause short-term exacerbations lasting several days.

Author's case studies

Chronic neck and interscapular pain

A 45-YEAR-old senior executive presented with a three-year history of left neck and interscapular pain since falling over the handlebars of his bicycle onto his chin and both arms, suffering a fracture-dislocation of the left elbow.

Neck and back pains had persisted despite regular physiotherapy and he experienced increasing neck pain associated with left-sided headaches. Plain films of the cervical spine had been taken at the time of the accident and showed no abnormality.

His neck and interscapular pain worsened while sitting at his computer or during long meetings. Pain also developed later in each day and was relieved by ibuprofen. At night, pain in bed varied with changes in his posture.

On examination there was shortening and hypertonicity in the left scalene muscles. He also had paraspinal tenderness over the facet joint articular column in the lower cervical spine, particularly over C5-6 on the right side and most noticeably over C6-7 on the left side.

There was a tender trigger point in the lower part of the left levator scapulae muscle and allodynia on irritation of the left upper back skin overlying the scapula. I applied vapour coolant spray and stretch technique to the left scalene muscles and instructed him in an exercise to stretch this muscle.

I mobilised the lower cervical spine using tense and stretch techniques and instructed the patient in an exercise to mobilise the lower neck. The technique was repeated two weeks later and the patient was asked to return after two months of the exercises.

Three-months later he reported he had been pain-free until the last two weeks, when he developed left neck tightening again and interscapular pain. He had also developed a left brow headache.

On examination there were signs of lower cervical spine tenderness over the cervicothoracic junction on the left, and a tender point in the left upper border of trapezius. There were also signs of minor segmental dysfunction at C3-4.

After mobilising C3-4 and injecting the trigger point, I instructed the patient in an exercise to stretch the left upper border of trapezius and asked him to continue with his mobilising exercises.

On review one month later the patient reported he had been pain-free until one week ago. I injected the upper borders of trapezius bilaterally with lignocaine and then applied stretching. Several months later the patient reported that he remained pain free.

Chronic vertigo

A 46-YEAR-old primary school teacher with a one-year history of vertigowas referred by her neurologist. She described an unsteadiness, not a rotational vertigo, which changed with altered posture.

For five years she had experienced right upper-border trapezius ache, which responded in the short term to massage. There was a past history of allergic rhinitis and sinusitis, and right periorbital pain that she thought might be due to sinusitis.

MRI of the head and cervical spine had already been conducted. These showed no abnormality. There were no facial sinus fluid levels or mucosal thickening.

Otological and balance testing was unremarkable. There was increased tone, particularly in the right upper border of the trapezius, and in the right sternocleidomastoid and the right levator scapulae, associated with cervical segmental hypomobility at C2-3 and C3-4.

The patient also had some cervicothoracic junction hypomobility, with a referral pattern to the right scapular area, the right infraspinatus muscle and the right proximal arm.

I used vapour coolant spray, stretching of these large muscles, and cervical spine mobilisation techniques to C2-3 and C3-4. I then instructed the patient in exercises.

Four weeks later her giddiness had resolved and her neck pain was reduced by about half. Treatment was repeated and this time C1-2 was also mobilised.

On review two months later her right neck pain had become episodic and was much less intense. She was asked to continue general neck-mobilising exercises long term. There has been no recurrence of her symptoms 18 months later.

References available on request

Recommended reading

Kenna C, Murtagh J. *Back Pain and Spinal Manipulation.* 2nd edition. Butterworth-Hienemann, Sydney 1996. (Very practical — still the best introductory text on spinal musculoskeletal pain assessment and treatment. Emphasis is mainly on segmental dysfunction.)

Gross J, et al. *Musculoskeletal Examination.* Blackwell Science, Cambridge, US, 1996. (A larger text covering musculoskeletal medical examination of the whole body. It is well illustrated. And includes common trigger points.)

Travell J, Simons D. *Myofascial Pain — the Trigger Point Manual.* Vols 1 & 2. Williams & Wilkins, Baltimore, 1992. (The detailed reference book and practical treatment guide, with detailed maps of trigger point referral patterns [expensive].)

Mense S, Simons D. *Muscle Pain. Understanding its Nature, Diagnosis and Treatment.* Lippincott Williams & Wilkins, Baltimore, 2001. (Technical but fascinating update on the science behind trigger points and myofascial pain.)

GP's contribution

PROFESSOR TENG LIAW
GP in Shepparton, Victoria

Case study

MRS GC, 48, complains of an aching pain in her neck, which has been coming and going often in the past few months. However, the current episode feels more severe. When the pain exacerbates there is tenderness in the muscles at the back of her neck.

She finds that massage helps to relieve some of the pain. Sometimes when she massages her neck muscles more vigorously she feels a sensation in the middle of her left upper arm. Sometimes, when it is particularly painful, she also gets a headache and feels dizzy.

Most times the pain settles within a few days, with topical anti-inflammatory rubs and massage, using a vibrating massager. More recently GC has been using a transcutaneous electrical nerve stimulation (TENS) machine for "rheumatism" in her hands and fingers. She did not complain of sleep problems.

GC is a slim tall woman with evidence of eczema on her face, arms and legs. One of her sisters experiences migraine. Her mother had a colon cancer successfully resected six years ago. Her father is deceased and had ischaemic heart disease.

On examination her neck is slightly stiff. The range of movements is not full because of pain during the examination. Tender areas are present overlying the left, mid-cervical paraspinal area and the body of both paraspinal muscles.

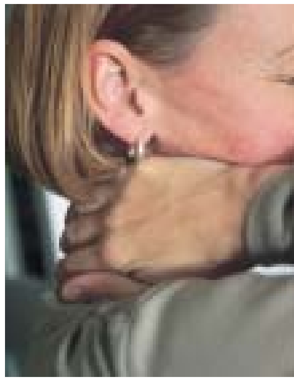
There are no obvious neurological deficits, especially of power or sensation in upper limbs. No active disease is evident in other body systems. An insurance examination, with blood tests, one year ago was normal.

She is prescribed a course of NSAID and encouraged to continue with her topical and massage therapy and mobilising neck exercises. She does not return for review of this most recent episode.

Questions for the author

What is/are the most likely diagnosis/diagnoses?

Ms GC's condition sounds benign, as it settles easily. However, it is recurring and is worsening and so merits a trial of manual treatment of any specific musculoskeletal pain generators you can palpate.



More information is needed. Massage of the neck region, if firm, can compress the brachial plexus and cause referred pain to the upper limb. Trigger points in the scalene muscles can also refer to the upper limb. Are the hand symptoms local, for example, arthritic, or referred or radicular? Headache and dizziness needs to be carefully assessed.

What other history should be obtained?

Is GC otherwise well? (System review may alert us to systemic disease or metastatic malignancy.)

What is the time pattern of the pain? (Constant worsening pain, waking from sleep, may indicate malignancy; early morning pain may be inflammatory.)

Does posture or movement alter the pain (suggesting mechanical pain)? What alters her pain, for example, work or home duties or recreational activities?

If an NSAID has helped the pain, we cannot assume inflammatory pain, because NSAIDs are analgesics too. Is the headache and dizziness a vertiginous migraine or is it a cervical vertigo and cervicogenic headache?

What investigations should be done? What would these tell us?

Testing should include hearing, fundoscopy, balance testing (including stepping with eyes shut, and provocation and cerebellar testing). These should be added to the physical examination if not already done.

Brachial plexus stretch testing should be done if you are suspicious of radicular pain. Only if not responding quickly to a trial of physical medicine techniques (over 2-4 treatments), investigate with plain films of the cervical spine, possible radionuclide bone scan, FBC, and C-reactive protein as an inflammatory marker.

CT or MRI may be considered for persisting radicular pain.

What would be best practice in managing this problem — preventive, short term and long term?

Encourage activity, not rest. Provide mobilisation treatment of each cervical segmental dysfunction (C2 for giddiness, C3 and C4 for neck pain, C5, C6 and C7 for arm pain) and stretching of trigger-point-affected muscles (scalenes, trapezius and levator scapulae and possibly sternocleidomastoids) at one week, then two weeks and one month later.

Home exercises to mimic the treatment sessions should begin on day one. Attention to seated posture and to tight muscles of the neck and shoulder girdle (eg, pectorals) and any weak muscles (eg, scapular stabilisers) should then be added to the preventive exercise program.

General questions for the author

Are vibrating massagers and other types of massagers that are available commercially of any use at all? For what specifically?

These are useful for short-term relief of tight tender muscles during flare. They do not appear to alter prognosis. TENS machines have a similar effect on pain perception.

Is there a role for oral steroids in, for example, more severe forms of musculoskeletal neck pain?

No. They may have a short-term role in inflammatory spondylitis such as psoriatic or rheumatoid arthritis. They have been used for disc protrusions compressing roots, but lateral foraminal steroid injections are more effective and have fewer side effects.

Do you have any other evidence, apart from some electron microscope studies, to support the view that trigger points are "bunched-up myofibrils"?

Electromyograms show increased activity near trigger points and 'silence' in the middle of trigger points. This may be consistent with increased muscle contraction in discrete areas of the muscle.

Do you have any information on the proportion of idiopathic neck pain or musculoskeletal neck disorders that settle spontaneously?

This is not really known but between 15% and 40% of acute neck presentations become chronic. There is evidence to suggest acute neck pain settles faster with manual treatment combined with exercises.

Australian Doctor How To Treat CPD

Australian Doctor Education

Instructions

Earn 2 CPD points by completing this quiz online or on the attached card. Mark your answers on the card and drop in the post (no stamp required) or fax to (02) 9422 2844. For immediate feedback click the 'Earn CPD pts' link at www.australiandoctor.com.au
Note that some questions have more than one correct answer. The mark required for CPD points is 80%. Your CPD activity will be updated on your RACGP records every January, April, July and October.

1. Which ONE of the following problems is least likely to be a presentation of mechanical neck dysfunction?
- a) Disturbance of balance ❑
- b) Neck pain associated with numbness in more than one dermatomal area ❑
- c) Atypical facial pain ❑
- d) Reduction in the range of movement of the neck ❑

2. Sally, 24, woke with neck pain. There has been no injury. Which management may be helpful to Sally (choose TWO)?
- a) Treatment with NSAIDs ❑
- b) She should be reassured that the neck pain is likely to be self-limiting ❑
- c) A soft collar should be used ❑
- d) Low-impact aerobic activity should be started if pain permits ❑

3. Bronwyn, 42, has a history of migraines, which have been more frequent recently. She complains of some pain in her neck. When examining her, which TWO findings would be typical of intervertebral dysfunction?
- a) Restriction in the range of movement towards the same side as the pain ❑
- b) Ipsilateral tenderness over the facet joint ❑
- c) Paraesthesia on the contralateral side ❑
- d) Hyperalgesia on the contralateral side ❑

4. There is facet joint tenderness at the level of C2-3. Which statements concerning mobilisation of the area are correct (choose TWO)?
- a) Mobilisation should be followed by a home mobilising technique ❑
- b) Pain should be provoked ❑
- c) Gentle posteroanterior-directed thumb pressure should be applied over the tender level for 30-60 seconds ❑
- d) Symptoms will not improve for one week after mobilisation ❑

5. On examination, exquisite local tenderness is demonstrated in the trapezius muscle. Which statement about the findings on examination of a trigger point is incorrect (choose ONE)?
- a) The pain should be reproducible ❑
- b) The muscle containing the trigger point may be hardened on palpation ❑
- c) Pain only occurs locally when the trigger point is stimulated ❑
- d) A local twitch response may be elicited ❑

6. Regarding management of trigger points, which ONE treatment is most likely to be beneficial?
- a) Acupressure ❑
- b) Injection of 0.5% lignocaine into the trigger point, preferably followed by stretching ❑
- c) Application of heat ❑
- d) Ethyl chloride applied topically to the affected area ❑

7. Bronwyn has had manual therapy at the affected facet joint and treatment to stretch the trigger-point-affected muscles, with a good response. To prevent recurrences, which management option is most likely to benefit Bronwyn (choose TWO)?
- a) Instruction in correct posture ❑
- b) Home stretching and mobilising exercises ❑
- c) She should be advised to sit with knees slightly higher than hips ❑
- d) Peri-articular injection of corticosteroid to the facet joint ❑

8. Fred, 62, has had chronic neck pain since experiencing a whiplash injury five years ago. Which therapy is least likely to help him?
- a) Mobilisation ❑
- b) A trial of NSAIDs ❑
- c) A trial of anticonvulsants ❑
- d) Cognitive behaviour therapy ❑

9. Fred considers spinal manipulation. Which factor is not a contraindication to treatment involving very short high-velocity thrust at the intervertebral joint (choose ONE)?
- a) Vertebrobasilar insufficiency ❑
- b) Hypermobility syndromes ❑
- c) Warfarin treatment ❑
- d) Tension headache ❑

10. Baclofen may be useful in the treatment of neck pain when muscle spasm is pronounced. Which ONE symptom is a rare side effect of baclofen?
- a) Hypotension ❑
- b) Daytime sedation and drowsiness ❑
- c) Nausea ❑
- d) Taste disturbances ❑

HOW TO TREAT
Editor: **Dr Lynn Buglar**
Co-ordinator: **Julian McAllan**

NEXT WEEK
The next How to Treat reviews conditions affecting the nose. The authors are **Dr Martyn Mendelsohn**, Sydney ENT and Facial Day Surgery, Chatswood, NSW; and **Dr John Ruhno**, department of allergy, Royal North Shore Hospital, and department of allergy, immunology and infectious disease, The Children's Hospital at Westmead, NSW.